CLAIMS

WE CLAIM:

1. A system for transmitting information modulated radio frequency (RF) signals between a plurality of communication nodes, comprising:

a first transceiver operable to receive a first modulated RF signal and convert the first modulated RF signal to a first modulated infrared (IR) signal; and

a second transceiver operable to receive the first modulated IR signal from the first transceiver and convert the first modulated IR signal to a second modulated RF signal that is substantially equivalent to the first modulated RF signal.

2. The system of Claim 1, wherein the first transceiver comprises:

a first signal source operable to supply a first reference signal; and

a first mixer circuit portion coupled to receive the first modulated RF signal and the first reference signal and operable to convert the first modulated RF signal to a third modulated RF signal having a lower principle frequency than the first modulated RF signal.

3. The system of Claim 2, wherein the first signal source comprises:

a first satellite transceiver circuit portion operable to receive and transmit a timing signal from a Global Positioning System (GPS) satellite as the first reference signal.

4. The system of Claim 2, wherein the first transceiver further comprises:

an IR transmitter portion coupled to receive the third modulated RF signal and convert the third modulated RF signal to the first modulated IR signal.

5. The system of Claim 4, wherein:

the IR transmitter portion comprises a variable intensity IR source; and

the first modulated IR signal is generated by modulating the intensity of the IR source.

6. The system of Claim 5, wherein the variable intensity IR source comprises a laser diode.

7. The system of Claim 2, wherein the first transceiver further comprises:

a first low-pass filter circuit portion coupled to receive the third modulated RF signal from the first mixer circuit portion and operable to filter unwanted high frequency components therefrom; and

an IR transmitter portion coupled to receive the filtered third modulated RF signal from the low-pass filter circuit portion and convert the third modulated RF signal to the first modulated IR signal.

8. The system of Claim 1, wherein the second transceiver comprises:

an IR receiver portion operable to receive the first modulated IR signal from the first transceiver and convert the first modulated IR signal to a fourth modulated RF signal that is substantially equivalent to the third modulated RF signal.

9. The system of Claim 8, wherein:

the IR receiver portion comprises an IR sensitive device; and

the fourth modulated RF signal is generated by modulating a voltage magnitude across the diode.

10. The system of Claim 8, wherein the second transceiver comprises:

a second signal source operable to supply a second reference signal; and

a second mixer circuit portion coupled to receive the fourth modulated RF signal and the second reference signal and operable to convert the fourth modulated RF signal to the second modulated RF.

11. The system of Claim 10, wherein the second signal source comprises:

a second satellite transceiver circuit portion operable to receive and transmit a timing signal from a Global Positioning System (GPS) satellite as the second reference signal.

12. The system of Claim 8, wherein the second transceiver further comprises:

a second signal source operable to supply a second reference signal; and

a second low-pass filter circuit portion coupled to receive the fourth modulated RF signal from the IR receiver and filter unwanted high frequency components therefrom; and

a second mixer circuit portion coupled to receive the filtered fourth modulated RF signal and the second reference signal and operable to convert the filtered fourth modulated RF signal to the second modulated RF signal.

13. The system of Claim 1, wherein the first transceiver is further operable to receive a second modulated IR signal and convert the second modulated IR signal to a third modulated RF signal.

14. The system of Claim 1, wherein the second transceiver is further operable to receive a fourth modulated RF signal and convert the fourth modulated RF signal to a second modulated IR signal.

15. The system of Claim 1, wherein:

the second transceiver is further operable to receive a third modulated RF signal and convert the fourth modulated RF signal to a second modulated IR signal; and

the first transceiver is further operable to receive the second modulated IR signal and convert the second modulated IR signal to a fourth modulated RF signal that is substantially equivalent to the third modulated RF signal.

16. The system of Claim 15, further comprising:

N-number of first and second transceivers configured in series with one another, whereby the second modulated RF signal output by one of the N-number of second transceivers is received by another one of the N-number of first transceivers, and the third modulated RF signal output by one of the N-number of first transceivers is received by another one of the N-number of second receivers.

17. The system of Claim 15, further comprising:

one or more third transceivers placed between the first and second transceivers, each of the third transceivers operable to receive a modulated IR signal and retransmit an other modulated IR signal that is substantially equivalent to the received modulated RF signal.

18. A method of transmitting information modulated radio frequency (RF) signals between a plurality of communication nodes, comprising:

converting, at a first node, a first modulated RF signal to a first modulated infrared (IR) signal;

transmitting the first modulated IR signal from the first node to a second node;

receiving, at the second node, the first modulated IR signal; and

converting the first modulated IR signal to a second modulated RF signal that is substantially equivalent to the first modulated RF signal.

19. The method of Claim 18, wherein the step of converting at the first node comprises:

mixing a first reference signal with the first modulated RF signal to convert the first modulated RF signal to a third modulated RF signal having a lower principle frequency than the first modulated RF signal.

20. The method of Claim 19, wherein the first reference signal comprises a timing signal transmitted from a GPS.

21. The method of Claim 19, wherein the third modulated RF signal is converted to the first modulated IR signal.

22. The method of Claim 19, wherein the step of converting at the first node further comprises:

filtering the third modulated RF signal to remove unwanted high-frequency signal components therefrom.

23. The method of Claim 18, wherein the step of converting at the second node comprises:

converting the received modulated IR signal to a fourth modulated RF signal; and

mixing a second reference signal with the fourth modulated RF signal to convert the fourth modulated RF signal to the second modulated RF signal.

24. The method of Claim 23, further comprising:

filtering the fourth modulated RF signal to remove unwanted high-frequency signal components therefrom, prior to mixing it with the second reference signal.

25. The method of Claim 23, wherein the second reference signal comprises a timing signal transmitted from a GPS.

26. The method of Claim 18, further comprising:

retransmitting the second modulated RF signal.

27. The method of Claim 26, further comprising:

repeating the steps of Claim 16 N-number of times.

28. The method of Claim 18, further comprising:

receiving, at the first node, a second modulated IR signal from the second node;

converting the second modulated IR signal to a third modulated RF signal; and

transmitting the third modulated RF signal.

29. The method of Claim 18, further comprising:

receiving, at the second node, a third modulated RF signal;

converting the third modulated RF signal to a second modulated IR signal; and

transmitting the second modulated IR signal to the first node.

30. The method of Claim 18, further comprising:

receiving, at the second node, a third modulated RF signal;

converting the third modulated RF signal to a second modulated IR signal;

transmitting the second modulated IR signal to the first node;

receiving, at the first node, the second modulated IR signal ; and

converting the second modulated IR signal to a fourth modulated RF signal that is substantially equivalent to the third modulated RF signal.

31. A system for transmitting information modulated radio frequency (RF) signals between a plurality of communication nodes, comprising:

a first transceiver operable to receive (i) a first modulated RF signal and convert the first modulated RF signal to a first modulated infrared (IR) signal and (ii) a second modulated IR signal and convert the second modulated IR signal to a second modulated RF signal; and

a second transceiver operable to receive (i) the first modulated IR signal from the first transceiver and convert the first modulated IR signal to a third modulated RF signal and (ii) a fourth modulated RF signal and convert the fourth modulated RF signal to the second modulated RF signal,

wherein the second modulated RF signal is substantially equivalent to the fourth modulated RF signal and the third modulate RF signal is substantially equivalent to the first modulated RF signal.

32. A method of transmitting information modulated radio frequency (RF) signals between a plurality of communication nodes, comprising:

converting, at a first node, a first modulated RF signal to a first modulated infrared (IR) signal;

transmitting the first modulated IR signal from the first node to a second node;

receiving, at the second node, the first modulated IR signal;

converting the first modulated IR signal to a second modulated RF signal;

converting, at the second node, a third modulated RF signal to a second modulated IR signal;

transmitting the second modulated IR signal from the second node to the first node;

receiving, at the first node, the second modulated IR signal; and

converting the second modulated IR signal to a fourth modulated RF signal,

wherein the second modulated RF signal is substantially equivalent to the first modulated RF signal and the fourth modulated RF signal is substantially equivalent to the third modulated RF signal.